CAC 231a) *Please provide a more complete description of the possible effects of, and range of possible consequences for lake sturgeon, recognizing and addressing the concerns raised by interveners in the EIS process.*

Effects on Lake Sturgeon are an important topic in the environmental reviews. The EIS and subsequent IRs include extensive discussion about the potential effects of the Keeyask Generation Project, potential mitigation measures, and residual effects (i.e. those that are expected to remain once mitigation is applied), as well as follow-up monitoring and potential adaptive measurement measures. As the preamble to the IR notes, these are issues that have already been raised in the regulatory review.

Information on Lake Sturgeon is extensive in the regulatory reviews, as follows:

- The Response to the EIS Guidelines: sections 6.2.3.3.5 and 6.4.6.2.
- Aquatic Effects Supporting Volume: section 6 (approximately 5 cm, i.e. 2 inches, thick).
- Examples of IRs related to sturgeon (not an exhausted list): DFO-0019 and DFO-0021 (TAC-Public Round 1), Brown-0004 (TAC-Public Round 1), Aboriginal/Public-0003a and b (TAC-Public Round 2), DFO-0025 and DFO-0098 (TAC-Public Round 2), DFO-0033 (TAC-Public Round 3), CEC-0031 (CEC Round 1) and CAC-0173 (CEC Round 2).

CAC IR-234 *Please provide the two most recent evaluations of Manitoba Hydro performance under the ISO 14001 Standard.*

CAC made this same request as CAC-0064 CEC Round 1 and made related requests in two IRs in Round 2 (CAC-0171 and CAC-0172). CAC-0064 (CEC Round 1) reads as follows:

> "Please explain how certification demonstrates continual improvement of environmental performance, with specific examples.
> "Please include a copy of the most recent ISO-14001 audit. If this is not possible, please summarize the outcomes of this audit, including areas where improvement was suggested."

CAC 237 a) *Can Manitoba Hydro confirm that its HHRA (Human Health Risk Assessment) in the Keeyask EIS suggested a post-impoundment risk that is more than 14 fold above the Health Canada tolerable daily intake? If this cannot be confirmed, please provide Manitoba Hydro's interpretation of the post-impoundment risk associated with Keeyask. (referenced CEC R1 20, CAC R1 0024a, CEC R1 0019).*

CAC 237 b) *Can Manitoba confirm that the U.S. Environmental Protection Agency tolerable daily intake limit is one-half of the Canadian limit.*

The Human Health Risk Assessment reviews the most recent scientific evidence on health effects from mercury and the traditional uses of the land by the various First Nations in the Keeyask study area. It was first filed as a draft report in the Socio-economic Supporting Volume and then as a final report in the first Supplementary Filing 1.

CAC 237a identifies three IRs from the environmental review processes. The following are additional IRs related to the topic of mercury and health:

- HC-0002 (TAC-Public Round 1), HC-0007 (TAC-Public Round 2), CAC-0020a (CEC Round 1) and CAC-0158 (CEC Round 2).
- The CAC asked over 20 questions related to the Human Health Risk Assessment in the first round of CEC IRs (CAC-0016 through to 0035, several of which have multiple questions) and a more limited number (for Manitoba Hydro's scan, four were identified) in the second round of CEC IRs (CAC-0157, 0158, 0160 and 0161).

CAC 238a) *Can Manitoba Hydro point to any peer-reviewed articles concluding that stocking of Lake Sturgeon has been a proven mitigation method relative to Hydro-electric development? If so, please provide them.*

CAC 238b) *Please provide electronic links to all learned articles relied upon in concluding that "stocking is a proven technique for increasing sturgeon populations."*

Information on stocking is extensive in the regulatory reviews, as follows:

- Response to the EIS Guidelines: section 6.4.6.2.
- Aquatics Environment Supporting Volume: and sections 6.3, 6.4, 6.5 and 6.6. Section 6.6 includes a bibliography of cited references.
- Examples of IRs related to sturgeon stocking (this is not necessarily an exhaustive list): DFO-0040 (TAC-Public Round 1), DFO-0098(TAC-Public Round 2), CEC-0031 (CEC Round 1), CAC-0041 (CEC Round 1), CEC-100 (CEC Round 2), PCN-0011 (CEC Round 2) and CAC-0156 (CEC Round 2). A bibliography of cited references is included with some IRs.

The CAC mentioned stocking in half a dozen of its IRs in the first round of CEC IR process (38, 39, 40, 41, 66 and73) and cited stocking again in Round 2 (CAC-0155). As well, information in the environmental reviews includes extensive literature citations and bibliographies

CAC 238c) *Does Manitoba Hydro agree that potential construction effects on Lake Sturgeon from Keeyask are: Mortality or injury may result from stranding during cofferdam dewatering, exposure to blasting, entrainment on intake pipes, and increased harvest by workers. Health could be negatively affected by decreases in water quality resulting from instream construction or accidental spills. Disruption of spawning in Gull Rapids due to disturbance by construction activities and habitat loss/alteration. Increased noise and rapid changes in water levels and velocities may cause individuals from Gull Lake to emigrate upstream or downstream. Sediment deposition in Stephens Lake may alter sub-adult and young-of-the-year habitat.*

CAC 238d) *Does Manitoba Hydro agree that potential operation effects on Lake Sturgeon from Keeyask are: Complete loss of spawning habitat in Gull Rapids. Potential for fish to become stranded in isolated pools after spillway operation. The generating station will act as a barrier to upstream movements. Changes in downstream movements due to the presence of the*

generating station. Habitat alterations may reduce the amount of suitable spawning and young-of-the-year habitat in the reservoir. The amount of foraging habitat in the reservoir will increase in the long term. Increased harvest due to increased access to the area.

A primary step in an environmental assessment is to determine the pathways of effect, i.e. the manner in which the environment could be affected by a project. Information on about the pathways of effects on sturgeon is set out as follows:

- Response to the EIS Guidelines: sections 6.4.6.2.1 and 6.4.6.2.2.
- Aquatic Environment Supporting Volume: sections 1.4.1 and 1.4.2.
- Examples of IRs related to this topic: DFO- 0039 (TAC-Public Round 1).

Manitoba Hydro's understanding regarding pathways of effects is available in the existing information in the environmental reviews. The CAC referenced "pathways" in CAC-17 (CEC Round 1)[i], which focused on the Human Health Risk Assessment, but did not do so regarding sturgeon.

(Other IRs also inquired about pathways of effects, although not for sturgeon, e.g. EC-0012, 0016 and 0017 [TAC-Public Round 1] and MMF-23 [CEC Round 1].)

CAC 239 a) *Please indicate whether any of the Keeyask Partner First Nations have suggested that there are additional boreal woodland caribou other than the recognized population ranges near Thompson which might be affected by the project.*

CAC 239 b) *Assuming that the hypotheses that the summer resident caribou are boreal woodland caribou, does Hydro agree that it is likely this group of animals would be defined by Environment Canada as Not Self-sustaining?*

Caribou are discussed extensively in the environmental impact statement. Information about summer resident caribou, woodland caribou and ATK regarding caribou is provided in the following:

- Response to the EIS Guidelines: sections 6.2.3.4.1, 6.2.3.4.7, 6.5.2 and 6.5.8.1.
- Terrestrial Environment Supporting Volume: section 7.3.6.3
- KCN Reports: Cree Nations Partners Environmental Evaluation Report (Tataskweyak Cree Nation and War Lake First Nation), Kipekiskwaywinan: Our Voices (York Factory First Nation) and Fox Lake Cree Nation Environmental Evaluation Report.
- Examples of IRs (this is not intended to be an exhaustive list): EC-0032b (TAC-Public Round 2), CEC 0037a (CEC Round 1), KK-0012 (CEC Round 1), MMF-006, CEC-0105 and 0106 (CEC Round 2), MMF-0045 (CEC Round 2) and KK-0016 (CEC Round 2).

CAC 251a) *Given that most adult lake sturgeon will be in the 800 to 1200mm range (considerably larger than 500 mm), please provide an evidence based estimate of the survival rate of lake sturgeon in the 800 to 1200 mm range. Please provide any peer reviewed studies relied upon for that estimate.*

Information in the EIS on sturgeon movements is set out as follows:

- Response to the EIS Guidelines: section 6.4.6.2.2.
- Aquatic Environment Supporting Volume: section 6 and appendix 1A.
- Examples of IRs (this is not an exhaustive list): DFO-0050, DFO-0051 and DFO-0103 (TAC-Public Round 1), DFO-0104 (TAC-Public Round 2), and CAC-0153 (CEC Round 2).

In CAC-36 (CEC Round 1), the CAC asked a question closely related to CAC 251a (NFAT):

> "Given that most adult lake sturgeon can be expected to pass through the trash racks, and that most of these will be in the 800 to 1200 mm range (considerably larger than 500 mm), and given that in general the risk of injury is greater for larger fish, can it really be expected that a considerable portion of these (very important) individuals will not be injured or killed?
> "Given that this proportion is unknown, please give detailed information on the planned monitoring program for establishing injury and mortality rates for large fish that are expected to pass through the trash racks."

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[1] The preamble to CAC-17 (CEC Round 1) states:

> "Typical sources of mercury exposures to humans are listed in Section 2.2 of the HHRA. This listing contains several potential exposure pathways and sources other than eating of fish from the lakes that will be impacted by the Keeyask Generation project. In Section 4.3 it is stated that human receptors were assumed to consume country (wild) foods including wild game, fish and plants. In addition, receptors were assumed to be exposed to surface water."